

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

Beiersdorf 696

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)

09/743385

INTERNATIONAL APPLICATION NO.
PCT/EP99/04851INTERNATIONAL FILING DATE
July 10, 1999PRIORITY DATE CLAIMED
July 10, 1998

TITLE OF INVENTION USE OF A METALLOCENE-POLYETHYLENE NONWOVEN AS BACKING MATERIAL

APPLICANT(S) FOR DO/EO/US Dirk LENZ, Jurgen TIMM, Yasurou ARAIDA

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following item and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
 - Copy of first page of WO 00/02969
 - Notification of Transmittal of International Preliminary Examination Report
 - Notification of Transmittal of International Search Report

09/743385

17. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :**

Neither international preliminary examination fee (37 CFR 1.482)
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO
and International Search Report not prepared by the EPO or JPO \$970.00

International preliminary examination fee (37 CFR 1.482) not paid to
USPTO but International Search Report prepared by the EPO or JPO..... \$860.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but
international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$760.00

International preliminary examination fee paid to USPTO (37 CFR 1.482)
but all claims did not satisfy provisions of PCT Article 33(1)-(4)..... \$670.00

International preliminary examination fee paid to USPTO (37 CFR 1.482)
and all claims satisfied provisions of PCT Article 33(1)-(4) \$96.00

CALCULATIONS PTO USE ONLY**ENTER APPROPRIATE BASIC FEE AMOUNT =**

\$ 860.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30
months from the earliest claimed priority date (37 CFR 1.492(e)).

\$

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	9 - 20 =	0	X \$18.00
Independent claims	1 - 3 =	0	X \$80.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$ 270.00

\$ 0

\$ 0

\$ 0

TOTAL OF ABOVE CALCULATIONS =

\$ 860.00

Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement
must also be filed (Note 37 CFR 1.9, 1.27, 1.28).

\$ 860.00

SUBTOTAL =

\$ 860.00

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30
months from the earliest claimed priority date (37 CFR 1.492(f)).

\$

+

TOTAL NATIONAL FEE =

\$ 860.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be
accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property

+

\$

TOTAL FEES ENCLOSED =

\$

Amount to be:
refunded

\$

charged

\$ 860.00

a. ☐ A check in the amount of \$_____ to cover the above fees is enclosed.b. ☒ Please charge my Deposit Account No. 14-1263 in the amount of \$ 860.00 to cover the above fees.
A duplicate copy of this sheet is enclosed.c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
overpayment to Deposit Account No. 14-1263. A duplicate copy of this sheet is enclosed.**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR
1.137(a) or (b)) must be filed and granted to restore the application to pending status.

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Beiersdorf 696-KGB
6713-St-ar

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS : Dr. Dirk LENZ, et al.
SERIAL NO. : To Be Assigned
FILED : Herewith
FOR : USE OF A METALLOCENE-POLYETHYLENE
NONWOVEN AS BACKING MATERIAL
ART UNIT : To Be Assigned
EXAMINER : To Be Assigned

January 9, 2001

Hon. Commissioner of Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

SIR:

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Insert as the first sentence: -- This application is a 371 of PCT/EP99/04851, which was
filed on July 10, 1999. --

IN THE CLAIMS:

Rewrite claim 1 as follows:

--1. (Amended) [Use of] A combination comprising a metallocene-polyethylene nonwoven as backing material and a self-adhesive coating, the said backing material being provided on at least one side with [a] said self-adhesive coating. --

Claims 2-9, line 1 in each, delete "Use" and substitute -- Combination --.

Claims 8 and 9, line 1 in each, delete "at least one of Claims 1 to 7" and substitute -- Claim 1 --.

REMARKS

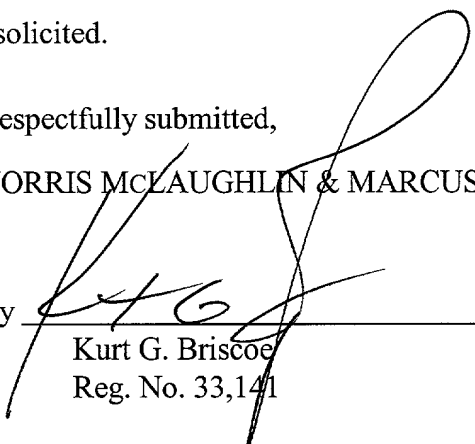
The amendments above were made with the sole purpose of converting the claims to standard "method of use" claims, and for eliminating multiple dependencies for reducing the filing costs.

Early and favorable action is earnestly solicited.

Respectfully submitted,

NORRIS McLAUGHLIN & MARCUS, P.A.

By


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5

Description

Use of a metallocene-polyethylene nonwoven as backing material

10 The invention relates to the use of a metallocene-polyethylene nonwoven as backing material in particular for rapid dressings, prefabricated surgical dressings, roll plasters and/or tape dressings and adhesive tapes.

15 Plasters offerings high wear comfort are distinguished by their great conformity to contoured areas of the body, by their readiness to move with moving joints (the fingers, for example) and, moreover, by their permeability to water vapour or even to air.

As a class of materials, nonwovens are particularly suitable as plaster backings. They are generally permeable to air, less expensive to produce than wovens, provided that common fibre materials are used, and they impart valuable tactile properties.

20 A disadvantage found with the common nonwovens for plaster applications is that they have limited elasticity and so are not ideally suited to contoured areas of the body.

25 Nonwovens can be produced by diverse techniques: for example, by the dry process, the spinbonding process or wet processes. This is followed by a series of finishing steps. In some cases, chemical binders are used (dry-laid webs), which bring with them the disadvantage of unwanted chemicals in the vicinity of the wound when the plaster is used.

30 A particularly preferred process is the melt blown process, in which, inter alia, elastomeric polymers or polymer mixtures are melted in an extruder and processed further in a spinning process. This produces a nonwoven having very high mechanical strength and consisting of extremely fine fibres (< 10 µm in diameter). The elastic properties of the polymer are retained by the nonwoven; that is, the material when subjected to elongations which occur in the normal course of use of plasters (max. 50 % elongation) exhibits virtually complete recovery.

35 The thermoplastic polymers, block copolymers based on styrene-butadiene-styrene (Kraton), polyurethanes or polyether- and polyester-urethanes employed to date for this

purpose have the disadvantage of in some cases a high price for the raw material or of unfavourable toxicological evaluation (for example, aromatic polyurethanes may give off aromatic amines).

Consolidation of these nonwovens takes place almost exclusively by thermal or mechanical means, so that the finished nonwoven does not come into contact with any further process chemicals or auxiliary chemicals in the course of its production. As a result, the materials produced by this process are particularly suitable for use in medical products such as plasters or dressing material.

5 EP 0 749 756 A2 discloses the production of nonwoven plasters based on polyester elastomers (more precisely, on a polybutylene terephthalate-polyether copolymer). The flexibility and extensibility of the material (> 600 %) are emphasised, and underline the special suitability of the material as a plaster backing.

15 EP 0 341 875 B1 discloses the use of an elastomeric nonwoven fibre web comprising melt-blown fibres having a diameter of less than 50 µm, with the limitation of a tensile strength of at least 30 g/2.5 cm/(g/m² basis weight). Thermoplastic elastomers described are polyurethanes, elastomeric polyesters, elastomeric polyamides, and A-B-A' block copolymers.

20 It is therefore the object of the invention to provide a backing material which avoids the disadvantages known from the prior art. This material should be inexpensive to produce and ecologically unobjectionable as well as offering pleasant wear comfort in use.

25 This object is achieved by the use of a backing material as set out in Claim 1. The sub-claims relate to advantageous developments thereof.

The invention proposes using a metallocene-polyethylene nonwoven as a backing material, the said backing material being provided on at least one side with a self-adhesive
30 coating.

The metallocene-polyethylene nonwoven preferably has the following properties:

- 35 • a basis weight of from 40 to 200 g/m², in particular from 60 to 120 g/m², and/or

- a thickness of from 0.1 to 0.6 mm, in particular from 0.2 to 0.5, and/or
- an ultimate tensile strength elongation lengthwise of from 300 to 700 % and/or
- an ultimate tensile strength elongation crosswise of from 250 to 550 %.

5 The fibres of the metallocene-polyethylene nonwoven preferably have a diameter of from 1 to 50 μm , in particular from 10 to 25 μm .

It has also been found advantageous if the metallocene-polyethylene nonwoven is additionally characterized by

- 10
- a load at 25 % elongation crosswise of from 0.7 to 4 N/cm and/or
 - a load at 50 % elongation crosswise of from 0.85 to 6.0 N/cm and/or
 - a load at 100 % elongation crosswise of from 0.6 to 8.0 N/cm and/or
 - a plastic deformation after 5-fold elongation and release by 50 % of from 5 to 15 %.

15 It is possible to emboss the nonwovens. The embossing area is preferably between 2 and 40 %, more preferably 10 to 25 %. To emboss the nonwoven temperatures of 80 °C to 100 °C and pressures of 10 to 100 (kg/cm^2) are used.

20 In one advantageous embodiment the polymer employed is a copolymer of ethylene and an α -olefin having a carbon number from C_4 to C_{10} , it being possible for the polyolefin to have a melt index of between 1 and 50 g/(10 min) and a density of from 860 to 900 kg/m^3 .

25 In another advantageous embodiment the metallocene-polyethylene polymer is blended with other polymers, for example LLDPE.

For the adhesive coating it is preferred to use commercially customary, pressure-sensitive adhesive compositions based on acrylate or on natural or synthetic rubber.

30 In addition, the reverse of the metallocene-polyethylene nonwoven may have been given an anti-adhesive treatment.

A new class of polymers for use as backing material is represented by the metallocene-polyethylenes, or single-site-catalysed PE grades.

These possess adjustable elastic properties and are priced very favourably in comparison with other thermoplastic elastomers.

Principle applications of the new materials are in connection with flexible packaging, hoses and tubes, cable sheathing, and injection mouldings. The elastomeric PE grades Affinity (Dow Chemical) and Engage (DuPont) consist of an octene-ethylene copolymer having a density of about 0.85 g/cm³.

Advantages of the use of m-PE over alternative thermoplastic elastomers, especially in connection with medical products, are in general as follows:

- material savings owing to better mechanical performance of the m-PE grades.
- low levels of residual catalyst in the polymer (up to 1000 times lower).
- lower raw-material price relative to other elastomeric polymers (Kraton, polyurethanes, polyesters, SIS).

As a result of this it is possible to produce a high-performance nonwoven for use in the plaster sector at a highly favourable price.

The present nonwoven material is manufactured on a conventional melt blown line, using elastomeric m-PE grades from DuPont or Dow Chemical, USA.

The materials have the physical properties indicated in Table 1.

The metallocene-polyethylene (mPE) is a polymer melt received by a die from an extruder and is further heated and extruded from a row of orifices as fine filaments while converging sheets of hot air (primary air) discharging from the die contact the filaments and by drag forces stretch the hot filaments to microsize. The filaments are collected in a random entangled pattern on a moving collector screen such as a rotating conveyer forming a nonwoven web of entangled micro-sized fibres.

The filaments freeze or solidify a short distance from the orifice aided by ambient air (secondary air).

Then the nonwoven web(sheet) is rolled up.

The m-PE nonwoven exhibits almost isotropic mechanical properties (identical values in lengthwise and crosswise directions). Even on multiple elongation by 50 % and subsequent contraction (5 cycles) a permanent plastic deformation of max. 20 % is obtained.

Coating the m-PE nonwoven with a pressure-sensitive adhesive composition yields pressure-sensitive adhesive (PSA) products which can conform outstandingly to contoured areas of the body and do not hinder any movement (for example, at the finger) by the body. The air-permeable material does not lead to any maceration, even after a prolonged period of wear. When the plaster is removed there is no splitting of the backing material, since the construction of the nonwoven gives it optimum cohesion. The outstanding properties of the nonwoven can be transferred to the plaster in an optimum manner.

The advantages set out above result in particularly advantageous applications of the PSA-coated m-PE nonwoven as rapid dressings, prefabricated surgical dressings, roll plasters and/or tape dressings.

As is generally the case with plasters, the rapid dressings or roll plasters can also be provided with a wound covering, which can in turn be lined with a release paper and sealed in sealing paper.

Furthermore, the nonwoven that has been treated to make it self-adhesive can also be employed with outstanding effect as an adhesive tape.

In the text below a use according to the invention is illustrated, using examples, without wishing unnecessarily to restrict the described invention.

Examples

The following table gives an overview concerning the manufacturing of Ethylene-Octene Copolymer and the conditions. Furthermore, a comparative example with conventional PE-polymers was made. Table 1D contains the properties of the nonwovens.

Table 1: Manufacturing Condition of TPO-MB Nonwoven

A. Polymer

	Condition 1	Condition 2	Condition 3	Condition 4	Condition 5	Control
Polymer	Ethylene-Octene Copolymer					LLDPE
Octene Content(%)	13.5		19.0	24.0	13.5	
Melt Index (g/10min.)	30					50
Polymer Blend	Non				LLDPE20%	

B. Melt Blown Condition

Nozzle Size (mm)	0.1 – 10	
Temp.of Extrusion(degC)	250 – 350	320

5 C. Embossing Condition

Embossing area(%)	10
Temp.(degC)	85
Pressure(kg/cm2)	35

D. Nonwoven Properties

	Condition 1	Condition 2	Condition 3	Condition 4	Condition 5	Control
Basis weight (g/m ²) (EN 29073 P1)	81.5	72.5	80.3	81.2	79.6	82.1
Thickness(mm) (EN 29073 P2)	0.35	0.32	0.43	0.42	0.43	0.55
Tensile strength(N/cm) MD (EN 29073 P3)	4.4	3.8	3.1	1.6	3.7	2.7
CD (EN 29073 P3)	2.4	2.0	2.2	1.0	3.3	1.4
Elongation(%) (EN 29073 P2) MD	480	443	486	396	258	80
CD	390	365	374	332	256	94
25% Modulus (%) CD	0.85	0.75	0.96	0.35	1.76	0.84
50% Modulus (%) CD	1.15	1.04	1.25	0.53	2.20	1.25

100%Modulus (%)CD	1.50	1.34	1.57	0.76	2.61	-
50%Cycle Hysteresis(%) 5times* MD	9	9	8	6	12	22
CD	10	12	9	6	12	22
AirPermeability(cc/cm2/sec)**	30	35	41	42	30	36
Average Fiber Diameter (μm)	17.4	18.2	16.9	18.4	15.1	15.3

*) Method of testing plastic deformation:

Test strips of the sample are cut to a width of from 15 to 20 mm and are inserted with a clamped-in length of 100 mm into a tensile testing machine. The testing sequence consists of five successive loading and release phases with continuous load measurement at a maximum elongation of 50 %, the testing speed being 200 mm/min. The permanent elongation of the sample is given in %.

** measured using the JIS 1096

Table 1D discloses the differences between the properties of the nonwovens made of mPE and the nonwovens made of conventional PE-polymers, especially after elongating the samples five times of 50 %. The mPE nonwovens show a permanent plastic deformation of max. 12 % compared with 22 % obtained with the conventional PE-polymers.

A nonwoven produced from elastomeric m-PE polymers (Dow Chemical, USA) by the melt blown process with subsequent thermal or water-jet consolidation and having a basis weight of 80 or 70 g/m², respectively, is coated with from 80 to 100 g/m² of a clinically tested rubber-based pressure-sensitive adhesive composition.

The good air permeability of the backing material permits air perforation of the applied composition by air brush during the application of the adhesive composition.

The metallocene-PE nonwovens treated with pressure-sensitive adhesive have the following physical properties:

Parameter	Unit	md/cd	Adhesive film mPE nonwoven 80 g/m ²	Adhesive film mPE nonwoven 70 g/m ²
Basis weight (EN 29073 P1)	[g/m ²]		162	149
Thickness (EN 29073 P2)	[mm]		0.41	0.40
Coating weight	[g/m ²]		80	77
Bond strength steel 180°	[N/cm]		5.4	5.0
Air permeability (Gurley)	s [cm ³ /cm ² *s]		1.9 (large plate) = 16.5	1.6 (large plate) = 19.6
Load at 25 % elongation **)	[N/cm]	md	2.03	1.50
		cd	0.84	0.66
Load at 50 % elongation **)	[N/cm]	md	2.59	1.98
		cd	1.18	1.01
Load at 100 % elongation **)	[N/cm]	md	3.15	2.48
		cd	1.56	1.36

**) Conditions in accordance with EN 29073 P3

Table 2: Physical properties of the coated metallocene-PE nonwovens

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The coated web is cut into narrow rolls (3.75 cm, 8 cm) and processed further into roll plasters, tape products and, on converting machines, into plaster strips, by application of a wound pad.

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Patent claims pending as a result of Preliminary Amendment dated January 9, 2001

1. A combination comprising a metallocene-polyethylene nonwoven as backing material and a self-adhesive coating, the said backing material being provided on at least one side with said self-adhesive coating.
2. Combination according to Claim 1, characterized in that the metallocene-polyethylene nonwoven has a basis weight of from 40 to 200 g/m², in particular from 60 to 120 g/m², and/or a thickness of from 0.1 to 0.6 mm, in particular from 0.2 to 0.5.
3. Combination according to Claim 1, characterized in that the metallocene-polyethylene nonwoven has an ultimate tensile strength elongation lengthwise of from 300 to 700 % and/or an ultimate tensile strength elongation crosswise of from 250 to 550 %.
4. Combination according to Claim 1, characterized in that the fibres of the metallocene-polyethylene nonwoven have a diameter of from 3 to 50 µm, in particular from 10 to 25 µm.
5. Combination according to Claim 1, characterized in that the polymer employed is a copolymer of ethylene and an α-olefin having a carbon number from C₄ to C₁₀, the polyolefin having a melt index of between 1 and 50 g/(10 min) and a density of from 860 to 900 kg/m³.
6. Combination according to Claim 1, characterized in that the adhesive coating consists of a commercially customary, pressure-sensitive adhesive composition based on acrylate or on rubber.
7. Combination according to Claim 1, characterized in that the reverse of the metallocene-polyethylene nonwoven has been given an anti-adhesive treatment.

8. Combination according to Claim 1 as rapid dressings, prefabricated surgical dressings, roll plasters and/or tape dressings.

5 9. Combination according to Claim 1 as adhesive tape.

WERNER & SÖHN

Abstract

Use of a metallocene-polyethylene nonwoven as backing material, the said backing material being provided on at least one side with a self-adhesive coating.

COMBINATION DECLARATION & POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled „**Use of a metallocene-polyethylene nonwoven as backing material**” the specification of which is attached hereto.

-OR-

was filed on _____ as

Application Serial No. _____ and was amended _____

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Claimed

198 30 864.7
(Number)

Germany
(Country)

10/07/1998
(Day/Month/Yr. Filed)

☒ yes ☐ no

(Number)

(Country)

(Day/Month/Yr. Filed)

☒ yes ☐ no

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

PCT/EP99/04851
(Application Serial No.)

10/07/1999
(Filing Date)

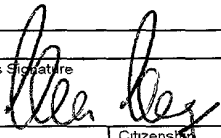
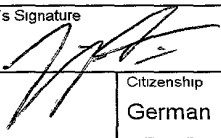
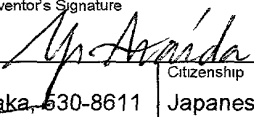
pending
(Status)
(patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punished by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named Inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

Kurt G. Briscoe, Reg. No. 33,141; William C. Gerstenzang, Reg. No. 27,552; Carmella A. O'Gorman, Reg. No. 33,749, and Stephen G. Ryan, Reg. No. 39,015 all of 660 White Plains Road, Tarrytown, New York 10591-5144; William R. Robinson, Reg. No. 27,224; Mark A. Montana, Reg. No. 44,948 all of 721 Route 202-206, Bridgewater, New Jersey 08807; Lorimer P. Brooks, Reg. No. 15,155; Davy E. Zoneraich, Reg. No. 37,267 all of 805 Third Avenue, 9th Floor, New York, NY 10022, my attorneys with full power of substitution and revocation.

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--------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------

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Full Name Of Second Inventor Jürgen Timm	Inventor's Signature 	Date 08.09.2000
Residence Vor der Heide 28, D21218 Seevetal, Germany Dex	Citizenship German	
Post Office Address Vor der Heide 28, D21218 Seevetal, Germany		
Full Name Of Third Inventor Yasurou Araida	Inventor's Signature 	Date 13/09/2000
Residence c/o Shin-Hankyu Building, 1-12-39, Umeda, Kita-Ku, Osaka, 530-8611	Citizenship Japanese JPK	
Post Office Address c/o Shin-Hankyu Building, 1-12-39, Umeda, Kita-Ku, Osaka, 530-8611, Japan		
Full Name Of Fourth Inventor	Inventor's Signature	Date
Residence	Citizenship	
Post Office Address		
Full Name Of Fifth Inventor	Inventor's Signature	Date
Residence	Citizenship	
Post Office Address		
Full Name Of Sixth Inventor	Inventor's Signature	Date
Residence	Citizenship	
Post Office Address		
Full Name Of Seventh Inventor	Inventor's Signature	Date
Residence	Citizenship	
Post Office Address		